Fachhochschule Lübeck

FACHRICHTUNG M.Sc. Medieninformatik

- Data Science -

Thema Exercises RAJ

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Inhalt

a) Create a 2x4 two dimensional matrix with random floats in it and in the next step determine the biggest element.

```
julia> x=rand(2,4)
2×4 Array{Float64,2}:
 0.914557  0.0130038  0.072633  0.196972
 0.565539  0.776015   0.948024  0.619623

julia> maximum(x)
0.948024172081573
```

Create two matrices of the same layout and test if addition and subtraction of the matrix works as expected: C = A + B

```
julia> a=rand(2,4)
2×4 Array{Float64,2}:
 0.0683751  0.506438  0.194541  0.675789
 0.0518886  0.953633  0.459017  0.97614

julia> b=rand(2,4)
2×4 Array{Float64,2}:
 0.856655  0.660163  0.413597  0.667793
 0.650226  0.573217  0.711678  0.432702

julia> c=a+b
2×4 Array{Float64,2}:
 0.92503   1.1666   0.608138  1.34358
 0.702114  1.52685  1.17069   1.40884
```

Now compare matrix multiplication either this way A * B and this way A .* B. Whats the difference?!

```
julia> a
2×4 Array{Float64,2}:
 0.0683751  0.506438  0.194541  0.675789
 0.0518886  0.953633  0.459017  0.97614

julia> b
2×4 Array{Float64,2}:
 0.856655  0.660163  0.413597  0.667793
 0.650226  0.573217  0.711678  0.432702

julia> a.*b.


ERROR: syntax: incomplete: premature end of input

julia> a.*b
2×4 Array{Float64,2}:
 0.0585739  0.334332  0.0804617  0.451287
 0.0337393  0.546639  0.326672   0.422377
```

With a.*b you multiply the values like this: a1*b1 a2*b2 a3*b3… , so the dimension oft he matrix does not change.

```
julia> a=rand(1:100,4,2)
4×2 Array{Int64,2}:
 50  53
 66  27
 25  42
  2  48

julia> b=rand(1:100,2,4)
2×4 Array{Int64,2}:
 46  34  30   3
  6  63  88  30

julia> a*b
4×4 Array{Int64,2}:
 2618  5039  6164  1740
 3198  3945  4356  1008
 1402  3496  4446  1335
  380  3092  4284  1446
```

The effect of a*b is, that the dimension of the array changes. Field one is 2618, because 50*46 + 53*6=2618.

3. What about matrix division with "/" or "\"?!

```
julia> d=a/b
2×2 Array{Float64,2}:
 0.629842  -0.132132
 0.622065   0.266194

julia> d=a\b
4×4 Array{Float64,2}:
  0.882698   0.602822  -0.000669748   0.767693
 -1.11525   -0.697032   0.357099     -1.03638
 -1.67446   -1.1082     0.196123     -1.49263
  2.49613    1.75726    0.28802       2.11685
```

Create a 3x3 integer matrix A with useful numbers. Now try A+1, A-1, A*2, A/2.

```
julia> l=[1 2 3;3 2 1;1 2 3]
3×3 Array{Int64,2}:
 1  2  3
 3  2  1
 1  2  3

julia> l+1
3×3 Array{Int64,2}:
 2  3  4
 4  3  2
 2  3  4

julia> l-1
3×3 Array{Int64,2}:
 0  1  2
 2  1  0
 0  1  2

julia> l*2
3×3 Array{Int64,2}:
 2  4  6
 6  4  2
 2  4  6

julia> l/2
3×3 Array{Float64,2}:
 0.5  1.0  1.5
 1.5  1.0  0.5
 0.5  1.0  1.5
```

Now multiply a 3x4 matrix with a suitable (4)vector.